Amendment to the Claims

1-44. (Cancelled).

45. (Currently Amended) A computer-readable medium whose contents cause at least one data processing device to perform a method to display data representing an electromagnetic signal from a sample, the method comprising:

receiving a sample signal that has been produced by applying a generated stimulus signal to a sample within an electromagnetically shielded detection apparatus in the absence of another generated signal from another signal source, wherein the electromagnetically shielded detection apparatus includes superconductive shielding, wherein a combination of the stimulus signal with an electromagnetic signal emitted by the sample takes on a different characteristic than the stimulus signal through stochastic resonance, and wherein the electromagnetically shielded detection apparatus includes therein a Super Conducting Quantum Interference Device electrically connected to at least one electromagnetic emission ~~detection coil~~detector, wherein the detector includes a second derivative gradiometer, and wherein the electromagnetically shielded detection apparatus is configured to align electromagnetic fields within the detection apparatus,

wherein the sample acts as a signal source for molecular signals, and wherein the electromagnetically shielded detection apparatus includes a cryogenic container and magnetic shielding external to the cryogenic container, wherein the stimulus signal is applied to the sample ~~within~~ in the absence of another generated signal from another signal source, and wherein the sample is not ionized or damaged during the receiving of the sample signal;

processing the sample signal to analyze characteristics of the ~~stochastic resonance~~sample signal; and

outputting the sample signal, wherein the sample signal is represented as a series of peaks at select frequencies, wherein the peaks are substantially greater than other peaks in the sample signal, and wherein at least some of the other peaks represent the stimulus signal.

46. (Previously Presented) The computer-readable medium of claim 45, wherein the outputting includes displaying, via a graphical user interface, the sample signal, wherein the sample signal is displayed as a series of peaks at the select frequencies.

47. (Previously Presented) The computer-readable medium of claim 45, wherein the processing of the sample signal includes applying a Fast Fourier Transform to the sample signal.

48. (Previously Presented) The computer-readable medium of claim 45, wherein the processing of the sample signal includes applying a linear mathematical process to the sample signal.

49. - 56. Canceled.

57. (Currently Amended) An apparatus for detecting molecular signals from a sample, the apparatus comprising:

means for detecting electromagnetic emission signals positioned near to the sample, wherein the means for detecting include a second derivative detector;

a Super Conducting Quantum Interference Device electrically connected to the ~~electromagnetic emission detection coil~~means for detecting, wherein the

Super Conducting Quantum Interference Device is positioned within a means for cryogenically cooling;

~~means for surrounding the sample with a stimulus signal and the means for detecting signals, wherein the stimulus signal has a substantially uniform amplitude over multiple frequencies;~~

means for electromagnetically shielding at least a portion of the sample, the ~~electromagnetic emission detection coil~~means for detecting, and the Super Conducting Quantum Interference Device, ~~and the means for surrounding, from external electromagnetic radiation~~wherein the means for electromagnetically shielding includes means for superconductively shielding, and wherein the means for electromagnetically shielding is positioned exterior to the means for cryogenically cooling;

means for aligning electromagnetic fields within the system;

means for controlling the Super Conducting Quantum Interference Device; and

means for outputting the electromagnetic emissions ~~providing observations regarding the signal~~ detected by the means for detecting.

58. - 60. Canceled.

Please add the following new claims 61 - 68

61. (New) The apparatus of claim 57, further comprising tube means for vertically receiving the signal source therein, wherein the tube means provides at least 2 kHz of low pass filtering.

62. (New) The apparatus of claim 57, further comprising automatic loading means for automatically and vertically positioning the signal source within the apparatus.

63. (New) The apparatus of claim 57, wherein the means for superconductively shielding comprising superconducting lead shielding that at least partially encloses the signal source and means for detecting.

64. (New) In an apparatus for interrogating a sample that exhibits low-frequency molecular motion, wherein the apparatus includes a container adapted for receiving the sample, an adjustable source of electromagnetic radiation for directing the electromagnetic radiation to the sample, with the sample in the container, and a detector for detecting an electromagnetic time-domain signal composed of sample source radiation superimposed with the electromagnetic radiation, an improvement comprising:

magnetic and electromagnetic shielding enclosing the container and sample, wherein the shielding includes superconductive shielding;

wherein the detector includes a second derivative gradiometer, and wherein the adjustable source of electromagnetic radiation and the detector are adjustable with respect to each other to allow alignment of electromagnetic fields within the system;

an electronic computer adapted to receive the time-domain signal from the detector, and to process the signal to generate a spectral plot that displays low-frequency spectral components characteristic of the sample in a selected frequency range between DC and 50 kHz, wherein the sample exposure to the electromagnetic radiation and the corresponding sample radiation detection are repeated until approximately optimal peak heights or waveform characteristics are observable in the sample radiation; and

a user interface to assist in identifying components in the sample, or characterizing the sample, based on the spectral plot of the signal from the electronic computer.

65. (New) The apparatus of claim 64, wherein the electronic computer includes a signal analyzer that functions to (i) calculate a series of Fourier spectra of the time-domain signal over each of a plurality of defined time periods, in a selected frequency range between 100 Hz and 50 kHz, and (ii) average the Fourier spectra.

66. (New) The apparatus of claim 65, wherein the calculating includes calculating at least five Fourier spectra, each taken over a 1-5 second time-domain interval.

67. (New) A method for interrogating a sample that exhibits low-frequency molecular motion, comprising:

placing the sample in a container having both magnetic and electromagnetic shielding,

(a) injecting electromagnetic radiation into the sample at a selected amplitude, and shielding the sample with superconductive shielding;

(b) recording an electromagnetic time-domain signal composed of sample source radiation superimposed on the injected electromagnetic radiation, wherein the injecting and recording includes adjusting electromagnetic fields associated with the injected electromagnetic radiation and/or the sample source radiation,

(c) generating a spectral plot that contains, at a selected power setting of the electromagnetic radiation, low-frequency, sample-dependent spectral components characteristic of the sample in a selected frequency range between 100 and 50 kHz,

(d) repeating (a)-(c) at different selected amplitudes until a plot showing a maximum or near maximum number of spectral components characteristic of the sample is generated, and

(e) based on the plot showing the maximum or near maximum number of spectral components, characterizing the sample, or identifying components in the sample based on a comparison with one or more stored plots.

68. (New) The method of claim 67, wherein the generating includes (i) calculating a series of Fourier spectra of the time-domain signal over each of a plurality of defined time periods, in a selected frequency range between 100 Hz and 50 kHz, and (ii) averaging the Fourier spectra.